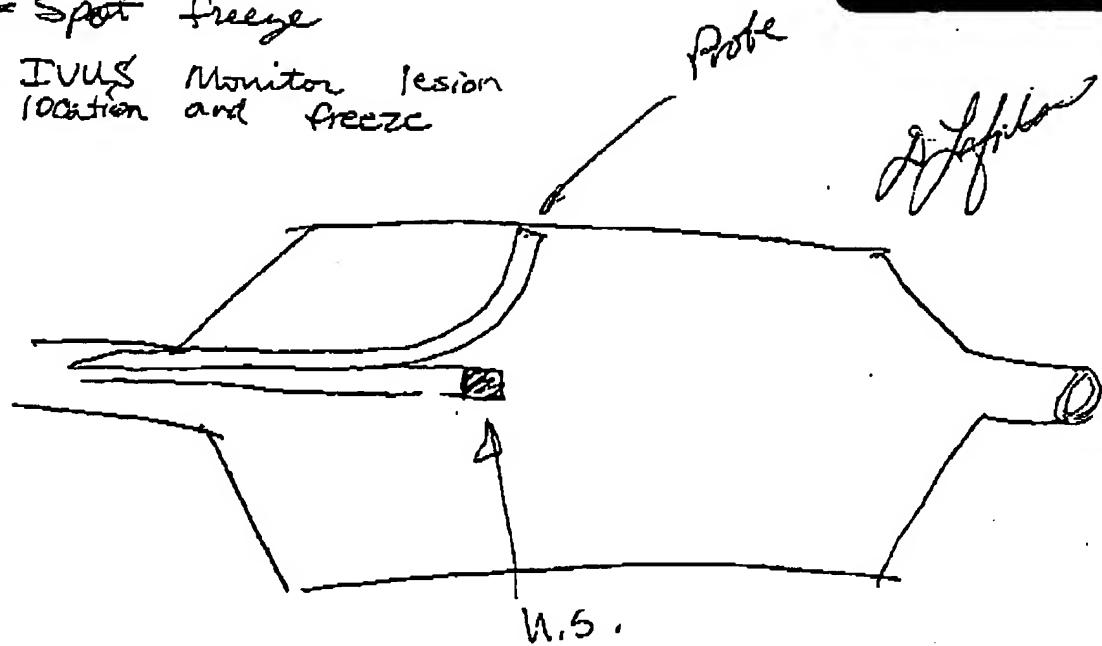


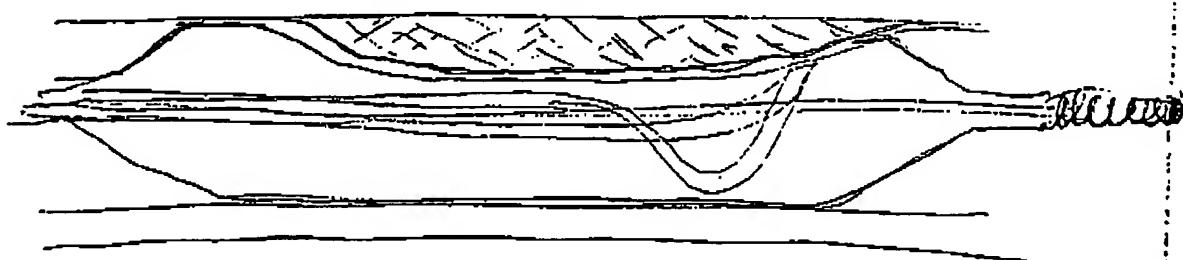
Cryo balloon

- = Spot freeze
- = IVUS location and monitor lesion freeze



IVUS

N.S.



IVUS

50 SH 775  
100 SHEETS  
200 SHEETS  
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22-142  
22-143

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## Key Points to Protect

- 1) evaporation cooling
- 2) wind chill effect

#1 Inflation of balloon with low pressure gas ( $\text{CO}_2$ ), combined with delivery of high pressure oxygen.

#2 as in #1 except that oxygen may be spot applied or eccentrically applied to create localized cooling (spot freezing within a chamber)

#3 as in #2, but where freezing is guided by visualization including ~~IVUS~~, OCT, ~~angiography~~, or impedance ~~imaging~~

#4 Method of evaporative cooling where as in #1 but that a wind chill effect is created by directing the low pressure gas to aid the evaporative cooling of the high pressure oxygen.

22-141 50 SHEETS  
23-142 100 SHEETS  
22-144 200 SHEETS



#5 Method of cooling with liquid  $\text{CO}_2$ , which utilizes a back-pressure closed system, and prevents the formation of dry ice by keeping the pressure above the triple point for  $\text{CO}_2$  of 5.1 atm. Cooling is accomplished by the "boiling" of the liquid  $\text{CO}_2$ , from 56.5 atm to 5.1 atm.

#6 As in #5 where pressure is regulated by an external pressure regulator

#7 as in #5, where release from high pressure to low pressure is accomplished through an orifice

#8 as in #8, where orifice is made of uniform distribution to spray entire inside of cryo chamber

#9 as in #5, where  $\text{CO}_2$  is sprayed to create focal spot cooling as described in #3.